WHAT IS CLAIMED:

1. A tree and branch distribution network for conveying data communications and television signals; the network comprising:

A feeder cable for carrying television signals and data communications from an upstream end to a downstream end, the downstream end connected to a first local distribution network and to a second local distribution network; the feeder cable having the capacity to carry communications in a band of frequencies above the band of frequencies that can be used reliably in the first and second local distribution networks;

the first local distribution network isolated from the second local distribution network so that a downstream communication delivered to the first local distribution network on a first downstream frequency would not be readable on the first downstream frequency by a client modem connected to the second local distribution network;

Within each of the first and second local distribution networks, a set of client modems for receiving data at the distal ends of the two local distribution networks, the client modems adapted for communication to a device connected downstream of the client modem;

A connection to a source of data communications to be conveyed over the feeder cable to the set of client modems at the distal end of the local communication networks;

Data communications at a first feeder cable frequency carried downstream over the feeder cable, the data communications received from the source of data communications for transmission to one of the set of client modems at the distal end of the first local distribution network;

Data communications at a second feeder cable frequency carried downstream over the feeder cable, the data communications received from the source of data communications for transmission to one of the set of client modems at the distal end of the second local distribution network; the second feeder cable frequency suitable for the feeder cable and above the band of frequencies that can be used reliably in the local distribution networks; the second feeder cable frequency different from the first feeder cable frequency;

A downstream frequency shifter in data communication with the downstream end of the feeder cable and the second local distribution network to shift the data communications on the

second feeder cable frequency to a downstream data frequency for the second local distribution network, the output of the downstream frequency shifter provided to the second local distribution network and conveyed to the set of client modems at the distal end of the second local communication network.

2. The tree and branch distribution network of claim 1 wherein the first feeder cable frequency equals a downstream data frequency for the first local distribution network.

3. The tree and branch network of claim 1 wherein the downstream frequency shifter comprises an oscillator, a synthesizer and a mixer.

4. The tree and branch network of claim 1 wherein the first local distribution network is isolated from the second local distribution network through use of directional taps positioned between the first and second local distribution networks and the feeder cable.

5. The tree and branch distribution network of claim 1 further comprising an upstream frequency shifter in data communication with the downstream end of the feeder cable and the second local distribution network to shift upstream communications from an upstream data frequency for the second local distribution network to a third feeder cable frequency; the third feeder cable frequency suitable for the feeder cable and above the band of frequencies that can be used reliably in the local distribution networks; the third feeder cable frequency different from the first feeder cable frequency and the second feeder cable frequency; the output from the upstream frequency shifter communicated to the feeder cable.

6. A multi-band extender for use in increasing the capacity of a tree and branch distribution network; the multi-band extender comprising:

a first splitter device connected to communicate with a feeder cable; the splitter device connected to the feeder cable through a connection that discriminates against frequencies in a first frequency band used by the feeder cable to carry television signals;

a downstream path exiting from the first splitter device and in data communication with a second splitter device;

an output of the second splitter device in data communication with a first filter to allow downstream travel of communications on a first frequency;

a first directional tap with a first port connected to a second port and to a third port, the second port isolated from the third port;

the first filter connected to the third port on the first directional tap;

the first port on the first directional tap connected to a high frequency port on a first diplexer; the first diplexer having a low frequency port in data communication with a source of television signals on the first frequency band below the first frequency;

a downstream leg of the first diplexer connected to a first local distribution network that is connected to at least one television and at least one client modem;

a second output of the second splitter device in data communication with a second filter to allow downstream travel of communications on a second frequency and to discriminate against communications on the first frequency;

the second filter connected to a downstream frequency shifter to shift the data communications on the second frequency to a second local distribution network downstream frequency;

a second directional tap with a first port connected to a second port and to a third port, the second port isolated from the third port;

an output of the downstream frequency shifter in data communication with the third port on the second directional tap;

the first port on the second directional tap connected to a high frequency port on a second diplexer; the second diplexer having a low frequency port in data communications with the source of television signals on the frequency band below the first frequency;

the downstream leg of the second diplexer connected to a second local distribution network that is connected to at least one television and at least one client modem.

7. The multi-band extender of claim 6 wherein: the second local distribution network contains at least one component rated for use in a frequency band range and the second frequency is outside the frequency band range.

8. The multi-band extender of claim 6 wherein the second frequency is above 1.0 GHz.

9. The multi-band extender of claim 6 wherein:

the second port on the first directional tap and the second port on the second directional tap are both in data communication with a combiner device;

an upstream output of the combiner device connected to the first splitter device whereby:

A) upstream communications from the first local distribution network may travel upstream from the first local distribution network,
through the first directional tap exiting out the second port, before passing
through the combiner device, before passing
upstream through the first splitter device before
reaching the feeder cable;

B) upstream communications from the second local distribution network may travel upstream from the second local distribution network
through the second directional tap exiting the second port, before passing
through the combiner device, before passing
upstream through the first splitter device before
reaching the feeder cable; and

C) the feeder cable carries:

television signals in the first frequency band;

downstream communications on the first frequency for use in the first local distribution network;

downstream communications on the second frequency (different from the first frequency) for use in the second local distribution network;

upstream communications from the first local distribution network; and

upstream communications from the second local distribution network.

10. The multi-band extender of claim 9 wherein:

a frequency used on the feeder cable to carry the upstream communications from the first local distribution network equals

a frequency used for upstream communication in the first local distribution network which equals

a frequency used on the feeder cable to carry the upstream communications from the second local distribution network which equals

a frequency used for upstream communication in the second local distribution network.

11. the multi-band extender of claim 6 wherein

the second port on the first directional tap is in data communication with a third filter set to pass an upstream frequency of the first local distribution network;

an upstream output of the third filter is in data communication with a combiner device;

an upstream output of the combiner device is in data communication with the first splitter device; and

The second port on the second directional tap is in data communication with a fourth filter set to pass an upstream frequency used by the second local distribution network;

an upstream output of the fourth filter is in data communication with an upstream frequency shifter that shifts the data communications on the upstream frequency used by the second local distribution network to a second upstream feeder cable frequency;

an output of the upstream frequency shifter is in data communication with a fifth filter set

to pass the second upstream feeder cable frequency;

an upstream output of the fifth filter is in data communication with the combiner device; wherein:

A) upstream communications from the first local distribution network may travel upstream from the first local distribution network through the first directional tap exiting the second port before passing
through the third filter, before passing
through the combiner device, before passing
upstream through the first splitter device before reaching
the feeder cable;

B) upstream communications from the second local distribution network may travel upstream from the second local distribution network through the second directional tap exiting the second port before passing
through the fourth filter before passing
through the upstream frequency shifter before passing
through the fifth filter before passing
through the combiner device before reaching
the feeder cable; and

C) the feeder cable carries
television signals in the first frequency band;
downstream communications on the first frequency for use in the first local distribution network;
downstream communications on the second frequency (different from the first frequency) for use in the second local distribution network;
upstream communications from the first local distribution network; and
upstream communications from the second local distribution network on the second upstream feeder cable frequency.

12. The multi-band extender of claim 11 wherein the second upstream feeder cable frequency is above 1.0 GHz.

13. The multi-band extender of claim 11 wherein:

a frequency used on the feeder cable to carry the upstream communications from the first local distribution network equals

the frequency used for upstream communication of the first local distribution network which does not equal

the second upstream feeder cable frequency.

14. The multi-band extender of claim 11 wherein:

the upstream communications from the first local distribution network are shifted from the upstream frequency of the first local distribution network to a first upstream feeder cable frequency and the first upstream cable feeder frequency does not equal the second upstream feeder cable frequency.

15. The multi-band extender of claim 11 wherein:

a single heterodyne frequency source, provided by a synthesizer, is used by both the downstream frequency shifter and the upstream frequency shifter.

16. A network containing a multi-band extender for use in increasing the capacity of a feeder cable in a tree and branch distribution network; the network comprising:

A) a first local distribution network for the distribution of television signals in a first frequency band and data communications to and from at least one client modem; the downstream communications to the at least one client modem at a first local distribution network downstream frequency and the upstream communications from the at least one client modem at a first local distribution network upstream frequency;

B) an upstream end of the first local distribution network in data communication with a common port of a first diplexer;

C) a low frequency port of the first diplexer connected to an output of a television amplifier providing television signals in the first frequency band;

D) a high frequency port of the first diplexer connected to a first port of a first directional tap, the first directional tap with the first port passing a signal to a second port and to a third port, the second port isolated from the third port;

E) the third port of the first directional tap in data communication with a second splitter device, an upstream end of the second splitter device connected to an output of a first amplifier;

F) an input of the first amplifier connected to a first splitter device having an upstream port;

G) the upstream port of the first splitter device connected to a high frequency port on a second feeder cable diplexer,

H) the second feeder cable diplexer having a low frequency port and a common port; the low frequency port set to pass the television signals in the first frequency band to the television amplifier;

I) the common port of the second feeder cable diplexer in data communication with the feeder cable;

J) the second port of the first directional tap in data communication with a first filter set to pass the first local distribution network upstream frequency;

K) an upstream output of the first filter in data communication with a combiner device;

L) an upstream output of the combiner device in data communication with an upstream amplifier;

M) the upstream amplifier in data communication with the first splitter device;

N) a second local distribution network for the distribution of television signals in the first frequency band and data communications to and from at least one client modem; the downstream communications to the at least one client modem at a second local distribution network downstream frequency and the upstream communications from the at least one client modem at a second local distribution network upstream frequency;

O) an upstream end of the second local distribution network in data communication with a common port of a second diplexer;

P) a low frequency port of the second diplexer connected to the output of the television amplifier providing television signals in the first frequency band;

Q) a high frequency port of the second diplexer connected to a first port of a second directional tap, the second directional tap with the first port passing a signal to a second port and to a third port, the second port isolated from the third port;

R) the third port of the second directional tap in data communication with the second splitter device;

S) the second port of the second directional tap connected to a second filter set to pass the second local distribution network upstream frequency;

T) an upstream output of the second filter is in data communication with an upstream frequency shifter that shifts the data communications on the second local distribution network upstream frequency to a second upstream feeder cable frequency;

U) an output of the upstream frequency shifter is in data communication with a third filter set to pass the second upstream feeder cable frequency;

V) a upstream output of the third filter is in data communication with the combiner device;

whereby:

upstream communications from the first local distribution network may travel upstream from the first local distribution network through the first directional tap exiting the second port before passing

through the first filter before passing

through the combiner device, before passing

through the second feeder cable diplexer before reaching the feeder cable; and

upstream communications from the second local distribution network may travel upstream from the second local distribution network through the second directional tap exiting the second port before passing through

the second filter before passing through

the upstream frequency shifter before passing through

the third filter before passing through

the combiner device before passing through the second feeder cable diplexer before reaching

the feeder cable; and

the feeder cable carries

television signals in the first frequency band;

downstream communications for use in the first local distribution network;

downstream communications for use in the second local distribution network;

upstream communications from the first local distribution network; and

upstream communications from the second local distribution network on the second upstream feeder cable frequency.

17. The network of claim 16 wherein the second local distribution network upstream frequency is below 1.0 GHz and the second upstream feeder cable frequency is above 1.0 GHz.

18. A method of increasing the capacity of a tree and branch network feeder cable to carry television channels in a first frequency band and data communications to a first local distribution network and a second local distribution network, the first local distribution network and the second local distribution network carrying data communications in a second frequency band above the first frequency band and below an operational ceiling frequency for reliable service within the first and second local distribution networks; the method comprising:

isolating the first local distribution network from the second local distribution network such that downstream data communications on a first frequency in the first local distribution network cannot be received on the first frequency by a client modem in the second local distribution network;

sending downstream communications to the first local distribution network over the network feeder cable at a first downstream frequency;

sending downstream communications to the second local distribution network over the network feeder cable at a second downstream frequency, the second downstream frequency above the second frequency band and different from the first downstream frequency;

downstream of the network feeder cable, shifting the downstream communications on the second downstream frequency to a frequency in the second frequency band that matches a second local distribution network downstream frequency;

whereby the network feeder cable carries downstream:

television channels in the first frequency band;

downstream communications on the first downstream frequency; and

downstream communications on the second downstream frequency.

19. The method of claim 18 further comprising the step of:

downstream of the network feeder cable, shifting the downstream communications on the first downstream frequency to a frequency in the second frequency band that matches a first local distribution network downstream frequency.

20. The method of claim 18 further comprising the steps of:

sending upstream communications from the first local distribution network over the network feeder cable on a first upstream frequency;

downstream of the network feeder cable; shifting upstream communications from the second local distribution network from a second local distribution network upstream frequency in the second frequency band to a second upstream frequency above the second frequency band and different from the first upstream frequency; whereby the network feeder cable carries:

television channels in the first frequency band;

downstream communications on the first downstream frequency;

downstream communications on the second downstream frequency;

upstream communications on the first upstream frequency; and

upstream communications on the second upstream frequency.

21. A method of increasing the capacity of a tree and branch network feeder cable to carry television channels in a first frequency band and data communications to a first local distribution network and a second local distribution network, the first local distribution network and the second local distribution network carrying data communications in a second frequency band above the first frequency band and below an operational ceiling frequency for reliable service within the first and second local distribution networks; the method comprising:

isolating the first local distribution network from the second local distribution network such that downstream data communications on a first frequency in the first local distribution network cannot be received on the first frequency by a client modem in the second local distribution network;

sending downstream communications to the first local distribution network over the network feeder cable at a first downstream frequency;

sending downstream communications to the second local distribution network over the network feeder cable at a second downstream frequency, the second downstream frequency different from the first downstream frequency;

downstream of the network feeder cable, shifting the downstream communications on the second downstream frequency to a second local distribution network downstream frequency;

whereby the network feeder cable carries downstream:

television channels in the first frequency band;

downstream communications on the first downstream frequency; and

downstream communications on the second downstream frequency.

22. The method of claim 21 wherein the second downstream frequency is the range of 5 MHz to 42 MHz.

23. The method of claim 21 wherein the second downstream frequency is in the frequency range of 750 MHz to 860 MHz.

24. The method of claim 21 wherein the second downstream frequency is in the first frequency band.

25. The method of claim 21 wherein the second downstream frequency is in the second frequency band.